

A clean version of the rewritten, added, and or cancelled text with instructions for entry pursuant to 37 C.F.R. §1.121 is attached hereto as Appendix 1. A marked-up version of the rewritten, added, and/or cancelled text pursuant to 37 C.F.R. §1.121 is attached as Appendix 2. It should be noted that the claims as originally filed, omitted claim 9. Claim 9 has been included in the amendment. As a result of the cancellation of claim 16, claims 17-20 have been renumbered as claims 16-19 and a new claim 20 has been added.

R E M A R K S

Applicant respectfully requests further examination and reconsideration in view of the above amendment and the arguments set forth fully below.

Applicant notes that the papers provided with the Office Action of 2 January 2002 did not include a copy of applicant's Supplemental PTO Form 1449 which was included with the Supplemental Information Disclosure Statement filed by applicant on 10 December 2001, and received in the PTO Mailroom on 18 December 2001. The Examiner is requested to confirm that the Supplemental Information Disclosure Statement has been received, and to return a copy of the Supplemental PTO Form 1449 annotated to show that the Examiner has considered all references disclosed by applicant in its 10 December 2001 Supplemental Information Disclosure Statement.

The Examiner objected to the specification as failing to provide a proper antecedent basis for the limitations expressed in claims 10 and 13-15, holding that applicant should insert these limitations in an appropriate place in the specification. Applicant has done so in the amendment set forth above for page 6 of the specification. In reviewing the specification for errors, applicant also noted a typographical error on page 4, which has been corrected in the amendment set forth above.

Applicant has also amended independent claim 12 by incorporating the limitation of dependent claim 16, and has, accordingly, cancelled dependent claim 16. As a result of the cancellation of claim 16, claims 17-20 have been renumbered as claims 16-19 respectively, and new claim 20 has been added.

The First §103 Rejection - Tao

The Examiner rejected original claims 1-26 (sic - should be 20) under 35 USC 103 as unpatentable over Tao, stating:

Tao teaches a vegetable lipid-based composition and candle comprising fully hydrogenated triglycerides and free fatty acids (see col. 1, lines 60-67). The triglycerides and free fatty acids are obtained from plant sources (see col. 2, lines 51-55) and are preferably saturated (see col. 3, lines 1-2). The free fatty acid triglyceride mixture contains from 1-99% triglyceride and from 1 to 99 free fatty acid (see Example 5). Tao teaches the limitations of the claims other than the difference that is discussed below.

Tao differs from the claims in that he does not specifically teach the claimed iodine value. However, it would be reasonable to expect that the triglycerides and fatty acids of Tao would possess the claimed iodine value because Tao teaches that the triglycerides are fully hydrogenated and that he prefers triglycerides and free fatty acids that are saturated.

The Examiner bears the burden of establishing a *prima facie* case of obviousness based on the prior art. *In re Fritch*, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). The Examiner here has admitted that Tao (and, indeed, none of the cited prior) teaches or suggests the claimed iodine value, and then seeks to fill in the missing element by merely speculating, without pointing to any support in the prior art, that "...it would be *reasonable to expect* that the triglycerides and fatty acids of Tao would possess the claimed iodine value." Such speculation on the part of the Examiner, in the absence of support in the cited art, does not establish a *prima facie* case of obviousness.

Moreover, such speculation runs directly contrary to the express teaching of Tao. Indeed, Tao teaches away from the present invention. Tao expressly states: "free fatty acids and fatty acid components of the triglycerides may be unsaturated as long as the final candle composition will be a solid at the temperature at which the candle is used." [Col. 3, lines 1-6]. Like the other prior art cited in this case, Tao looks to hydrogenation only for the purpose of providing fuel which will be solid at room temperature. Tao neither recognizes, nor suggests, that by exclusively using low-IV fatty acids and triglycerides, as expressly claimed in applicant's independent claims 1, 12 and 18 (as amended), a substantially soot-free candle can be achieved.

Accordingly, applicant respectfully submits that independent claims 1, 12 and 18 (as amended) fully distinguish, and are patentable over, the Tao reference. Dependent claims 2-11, 13-17 and 19-20 (as amended) are, for the same reasons, patentable over the Tao reference.

The Second §103 Rejection - Will

The Examiner rejected original claims 1-20 under 35 USC 103 as unpatentable over Will, stating:

Will teaches a candle composition comprising 50% or more of a hydrogenated vegetable oil and the remainder stearic acid (see lines 18-32). The preferred oil is rapeseed; however, other oils may be used (see lines 56-58). Will teaches the limitations of the claims other than the differences that are discussed below.

In the first aspect, Will differs from the claims in that he does not specifically teach the claimed IV. However, it would be reasonable to expect that the oils of Will possess the claimed IV because Will teaches that the oils are hydrogenated.

In the second aspect, Will differs from the claims in that he does not specifically teach that the stearic acid is from a plant source. However, it would be reasonable to expect that the acid would be from a plant source because Will is using only natural ingredients in his candle.

Once again, the Examiner has admitted that Will lacks any specific teaching or suggestion to use materials having a specified, low IV. Instead, the Examiner seeks to provide the missing element by speculating that Will's oils possess the claimed IV because Will teaches that the oils are hydrogenated. The Examiner also speculates that Will's stearic acid must come from a plant source, since Will teaches using only "natural" ingredients in his candle. The Examiner's speculation is not supportable. The term "hydrogenated" cannot be correlated to a specific iodine value, and therefore has no more than a very general meaning standing alone. Likewise, the term "natural" does not necessarily mean plant source. Will, for example, specifically teaches the use of Beeswax which, while "natural" is not from a plant source. As noted above, such speculation is impermissible and cannot be used to support a rejection under 35 USC 103. What is required is a suggestion contained in the cited prior art. The Examiner has pointed to no such suggestion in the record.

As noted above, Will's express purpose is to produce a candle having 50% or more vegetable oil, and therefore usable in rubrics, which is solid and self-supporting at room temperatures. See, e.g., Will, lines 4-8. Will does not teach any particular degree of hydrogenation. Even today, the term "hydrogenated" does not correlate to any specific IV, and may, in fact, be used to refer to materials having IVs well in excess of those claimed by the present invention. Since Will teaches hydrogenation of vegetable oil only to achieve solidification, one would expect such hydrogenation to stop well before achieving the low IVs claimed by the present invention.

Finally, Will does not disclose or suggest anything with respect to the remaining components of the candle, or with respect to the final candle composition, except that it be solid. As admitted by the Examiner, Will says nothing about IV. Therefore, not only does Will not teach use of a low-IV vegetable oil, Will also says nothing about the IV of the wax which is mixed with Will's "hydrogenated" vegetable oil. This illustrates the patentable distinction between Will and the present application, which expressly claims and teaches a candle composition having the low IVs specified in claims 1-20 (as amended).

Accordingly, applicant respectfully submits claims 1-20 (as amended) are allowable over Will.

The First §102 Rejection - Calzada

The Examiner rejected original claims 12, and 15-20 as anticipated by Calzada (U.S. Patent 6,063,144) stating:

Calzada teaches a non-paraffin candle composition comprising plant source stearic acid and hydrogenated vegetable wax (hydrogenated castor oil)(see col. 2, lines 9-28; col. 3, lines 12-15). Calzada desires a stearic acid and vegetable wax that have an iodine number no greater than 7 (see Col. 2, lines 51-53 and col. 3, lines 9-12). Accordingly, Calzada teaching all material limitations of the claims, anticipates the claims.

The Examiner has cited Calzada under 35 USC 102(b): "A person shall be entitled to a patent unless--(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Applicant respectfully submits that Calzada does not constitute prior art to the present application under 35 USC 102(b). The record establishes that the present invention was filed on 26 September 2000, claiming priority from provisional application 60/155,848 filed 24 September 1999 and provisional application 60/159,062 filed 12 October 1999. Regardless of whether the present application is accorded the earliest filing date from which it claims priority (24 September 1999) or the later priority filing date (12 October 1999), these dates are both less than one year after the filing date of Calzada (13 February 1999). As Calzada was not filed more than one year prior to the earliest priority date of the present invention, as required by 35 USC 102(b), it cannot be cited against the present application as prior art.

Moreover, Calzada suffers from the same difficulty as the cited prior art, and does not address the IV of the candle. While Calzada discloses that his vegetable wax preferably has an iodine number not greater than 7, Calzada allows for the presence of vegetable oils which "...can contain triglycerides of saturated and unsaturated fatty acids. The iodine number of such vegetable oils is preferably in the range of 15 to 150...". [Calzada, Col. 3, lines 18-22]. Calzada neither suggests nor appreciates the relationship between the IV of the candle composition as a whole and the reduction of soot. Accordingly, applicant believes that even if Calzada had been filed more than one year prior to the earliest priority date of the present application, it would not constitute an anticipating reference.

The Second §102 Rejection - JP63168494

The Examiner rejected original claims 1-4 as anticipated by JP63168494 stating:

JP teaches a composition of hydrogenated palm stearin having an iodine value of 1-5. JP teaches that these products are suitable for use in preparing candles (see abstract in its entirety). JP teaching all the material limitations of the claims, anticipates the claims.

The test for anticipation is one of strict identity. See, e.g., *Leinoff v. Louis Milona & Sons, Inc.*, 726 F.2d 734, 738 (Fed. Cir. 1984); *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772 (Fed. Cir. 1983). Anticipation requires the presence in a single prior art disclosure of all elements and limitations of a claimed invention arranged as they are in the claim. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)(citing *Soundcriber*

Corp. v. United States, 360 F.2d 954, 960 (Ct. Cl. 1966). A reference which excludes a claimed element does not anticipate. *Kalman*, 713 F.2d at 771-72. Foreign patents and published foreign patent applications are "printed publications" and, as such, are restricted in their teachings to what is fairly disclosed. *In re Boe*, 355 F.2d 961 (CCPA 1966); *Corometrics Medical Systems v. Berkeley Bio-Engineering*, 193 USPQ 467, 475 (ND Cal. 1977). For an invention to be anticipated by a printed publication, the publication itself must enable someone to practice the invention. *Reading & Bates Construction Co. v. Baker Energy Resources Corp.*, 748 F.2d 645, 651 (Fed. Cir. 1984)(citing *Preemption Devices, Inc. v. Minnesota Mining & Manufacturing Co.*, 732 F.2d 903, 906 (Fed. Cir. 1984)).

Applicant respectfully submits the 102 rejection of claims 1-4 is improper because JP63168494 neither enables nor fairly teaches one having ordinary skill in the art how to produce a low-soot or no-soot candle as claimed by applicant's claims 1-4. At best, all JP63168494 teaches is that hydrogenating palm stearin to an Iodine Number of 1-5 provides a product useful for preparing candles, matches and wax paper. Based upon the products cited, applicant submits that the usefulness of the JP stearin for the cited products derives from the fact that the hydrogenation converts the stearin to a solid. This adds nothing new to the prior art already cited. More importantly, there is no recognition, or suggestion, by JP63168494 that the hydrogenated stearin would be useful for creating a reduced-smoke candle.

Indeed, JP63168494 addresses only palm stearin, and does not suggest or teach anything with respect to the remaining components -- such as a wick, a wax component, and possibly color, scent, and/or paraffin -- which one having ordinary skill in the art would typically use to create a candle. See, e.g., the Will reference and/or Tao reference. Accordingly, JP63168494 cannot be held to anticipate independent claim 1, in which the candle (and not merely one component thereof) is claimed to have an iodine value of less than 10. While applicant's candle of claim 1 is comprised "substantially" of triglycerides (such as, for example, palm stearin), as claimed it is not comprised exclusively of triglycerides. This distinction has been clarified by the amendment to claim 1. As noted in the specification, and as construed by the dependent claims, other components are present. The important factor for

insuring a reduced soot candle, is to control the IV of the candle, not just a single component of the candle.

Accordingly applicant respectfully submits that claims 1-4 (as amended) are not anticipated by JP63168494.

The Third §103 Rejection - JP63168494

The Examiner rejected claim 5 as obvious over JP63168494 stating:

JP has been discussed above. JP fails to teach that the hydrogenated palm stearin has an iodine number of less than 1. However, a prima facie case of obviousness exists where the claims ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals v. Banner*, 227 USPQ 773 (Fed. Cir. 1985).

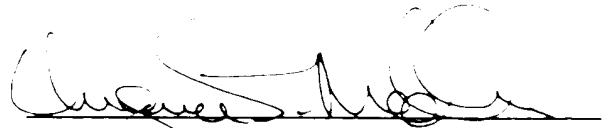
As noted above, applicant believes independent claim 1 is not anticipated, or obvious, in view of JP63168494. In suggesting the hydrogenation of palm stearin to an iodine number of 1-5, JP appears to be concerned solely with producing a solid form of palm stearin useful for preparing "...candles, matches and wax paper." Accordingly, there would be no incentive for JP63168494 to hydrogenate to an iodine number of less than 1, since the additional processing cost would not be needed to achieve the desired result (a solid wax).

Moreover, JP63168494 provides no disclosure whatsoever regarding any specific candle compositions, let alone the construction of a candle intended to produce low-soot or no-soot. Where references do not even hint at the problem solved, they have nothing in common with the claimed invention and do not render the invention obvious. *In re Benno*, 768 F.2d 1340 (Fed. Cir. 1985).

Accordingly, applicant respectfully submits the pending claims, as amended, are fully allowable over the cited prior art. Applicant requests allowance at an early date. The Examiner is requested to contact the undersigned in the event any further obstacles to allowance remain which can be resolved by an Examiner's amendment.

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APPENDIX 2
MARKED-UP VERSION OF REWRITTEN, ADDED,
AND/OR CANCELLED TEXT

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value of the free fatty acid material is preferably less than 10, 7.5, 5, 3, 1, or 0.5.

The attainment of the foregoing and related advantages and features of the invention should be more readily apparent to those skilled in the art, after review of the following more detailed description of the invention taken together with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagram of a candle in accordance with the present invention.

Fig. 2 is a diagram of a triglyceride in accordance with the present invention.

Fig. 3 is a diagram of a free fatty acid in accordance with the present invention.

DETAILED DESCRIPTION

The present invention achieves low-soot, low-smoke candles by virtue in part of using triglycerides (TGs) and free fatty acids (FFAs) that have low Iodine Values (IVs). IV for purposes of the present invention is a measure of the unsaturation of fats and oils and is expressed in terms of the number of centigrams of iodine absorbed per gram of sample (% iodine absorbed). The preferred measurement protocol is Official Method Cd 1d-92 of the American Oil Chemists Society, though other protocols may be used. IVs are an indication of the degree of unsaturation within the triglycerides and/or free fatty acids, and the amount of unsaturated triglycerides and/or free fatty acids is proportional to the amount of undesired combustion products (i.e., soot and smoke, etc.). Thus, reducing the level of unsaturation reduces IV and also reduces ~~soot~~ the potential for soot and smoke production

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A candle made from TG alone will have a bright flame and burn relatively rapidly. A candle made from FFA alone will have a low flame and burn more slowly. By mixing these two products together, a candle can be achieved that has an appealing, steady flame and that burns relatively slowly.

In one embodiment, the mix of FFA to TG for a preferred candle burn is approximately at least about 3% to about 35% by weight FFA, and most preferably is at least about 4% to about 22% by weight FFA by weight. Most preferably, such FFA is plant source FFA. In another embodiment, the mix of FFA to TG for a preferred candle burn is at least about 40% by weight TG, and most preferably at least about 70% by weight TG. Again, most preferably, such TGs are plant source TGs.

Palm Stearine or related TG

Palm stearine (a hydrogenated TG) is preferred because palm stearine is currently a low-cost by-product of palm oil processing and therefore readily available and inexpensive. Furthermore, palm stearine and related plant source TGs are derived from a renewable, non-animal source. These qualities are highly sought after as our society moves towards sustainable resource practices. Also, plant source TGs and FFAs tend to have lower odors.

Candle 10 is preferably made as follows. Palm stearine is available commercially and is usually shipped as flakes. This flaked material can be provided having the lower and more desired IVs of the present invention. In one embodiment, a preferred IV of the TG component is less than 1.0 and more preferably approximately 0.5 or less. The FFA vegetable stearic acid is similarly commercially available, shipped as flakes and is provided having the lower and more desired IVs of the present invention. In one embodiment, a preferred IV for the FFA component is less than 1.0, and more preferably approximately 0.5 or less. These components are preferably melted at temperatures of approximately 180 degrees F and then mixed and poured into a mold about wick 12. The molten wax cools to form the candle body 11. Wick 12 is preferably a paper core cotton wick.

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1. (Once Amended) A candle comprised substantially of hydrogenated plant source triglycerides in combination with other components, said candle having an iodine value of less than 10, whereby when said candle is burned substantially no soot is produced.

2. The candle of claim 1, wherein said iodine value is less than 7.5.

3. The candle of claim 1, wherein said iodine value is less than 5.

4. The candle of claim 1, wherein said iodine value is less than 3.

5. The candle of claim 1, wherein said iodine value is less than 1.

6. The candle of claim 1, further comprising, in combination with said triglyceride, a free fatty acid.

7. The candle of claim 6, wherein said free fatty acid includes a plant source free fatty acid.

8. The candle of claim 6, wherein said plant source triglycerides and said free fatty acid have an iodine value of 5 or less.

~~20~~ (New) The candle of claim 6, wherein said plant source triglycerides and said free fatty acid have an iodine value of 1 or less.

~~9~~ (Once Amended) The candle of claim 6, wherein said candle includes from about 2% to about 35% by weight free fatty acid.

~~10~~ (Once Amended) The candle of claim 6, wherein said candle includes from about 4% to about 22% by weight free fatty acid.

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¹¹
~~12.~~ (Once amended) A candle comprised at least in part of plant source triglycerides and plant source free fatty acids, said candle having an iodine value of less than 10.

¹²
~~13.~~ (Once amended) The candle of claim 12, wherein said candle includes at least about 40% by weight plant source triglyceride.

¹³
~~14.~~ (Once amended) The candle of claim 12, wherein said candle includes at least about 70% by weight plant source triglyceride.

¹⁴
~~15.~~ (Once amended) The candle of claim 12, wherein said candle includes at least about 4% by weight plant source free fatty acid.

~~16.~~ The candle of claim 12, having an iodine value of less than 10.

¹⁶
~~17.~~ ~~16.~~ (Once amended) The candle of claim 12, having an iodine value of less than
5.

¹⁷
~~18.~~ ~~17.~~ (Once amended) The candle of claim 12, having an iodine value of less than
1.

~~19.~~ ~~18.~~ (Once amended) A candle comprised substantially of hydrogenated triglycerides and hydrogenated free fatty acids, said candle having an iodine value of less than
10.

~~20.~~ ~~19.~~ (Once amended) The candle of claim 18, having an iodine value of less than
5.

²¹
~~21.~~ (New) The candle of claim 18, having an iodine value of less than 1.

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